

Abstracts

Session A: 10:00 am, Steve Jones, Ph.D., University of New Hampshire

Microbial Source Tracking: Identifying Sources of Bacterial Pollution in Coastal New Hampshire

Many of New Hampshire's coastal waters are polluted with fecal wastes that may contain pathogenic microorganisms. Recently developed DNA technologies allow for identification of the actual species from which bacterial contaminants in surface waters originate. Several studies in coastal New Hampshire waters have involved ribotyping of *Escherichia coli* to identify pollution sources. The results have helped managers to focus efforts on specific types of pollution sources to improve water quality.

Session B: 10:00 am, Larry Harris, Ph. D., University of New Hampshire

Invasive Species Rapid Assessment Survey

Marine benthic community composition has been changing rapidly in recent years as a series of introduced species appear and assume prominent roles. The focus of this presentation will be to describe some of the major changes in community structure that have occurred over the last 30 years with an emphasis on introduced species. Results from surveys for invasive species conducted in 2000 and 2003 will be reviewed and examples of recent introductions as well as species likely to appear soon in the Great Bay estuarine system will be presented.

Session A: 10:30 am, Richard Langan, Ph.D., University of New Hampshire

Nitrogen Loading in the Great Bay Estuary

In many aquatic systems in the US and worldwide, eutrophication caused by excessive inputs of nutrients has altered ecosystem structure and function and in some locations has resulted in severe impacts to valuable natural resources. While phosphorus has been identified as the critical nutrient driving eutrophication in freshwater, it is generally accepted that excessive amounts of nitrogen are the primary cause of eutrophication in marine and estuarine waters. The Great Bay Estuary receives nutrient additions from natural and human sources including wastewater, contaminated groundwater and atmospheric deposition. While severe impacts have not been observed, recent data indicates that some locations may be showing signs of eutrophic conditions. This presentation will provide information on current conditions in the estuary, estimates of nitrogen loading from identified sources and trends in water quality parameters that are used to determine the impacts of excessive nutrient input.

Session B: 10:30 am, Megan Tyrrell, MA Coastal Zone Management

Ecology of the Introduced Crab, *Hemigrapsus sanguineus*, in Northern New England

The ecology of the introduced crab, *Hemigrapsus sanguineus*, especially its possible impact on the intertidal community, will be discussed. The results of microcosm experiments and community structure monitoring will be presented in light of possible changes that may occur as *Hemigrapsus* becomes more abundant in the region. A retrospective analysis of probable impacts resulting from the introduction of *Carcinus maenas* will also be presented.

Session A: 11:00 am, Phil Trowbridge, NH Estuaries Project / NH Department of Environmental Services

Impervious Surfaces in New Hampshire's Coastal Watershed

The NH Estuaries Project mapped impervious surfaces in NH's coastal watershed in 1990 and 2000 using remote sensing technology. The percent of the watershed covered by impervious surfaces grew from 4.7% to 6.8% over the ten year period. In 25 of the 42 towns in the watershed, the acres of impervious surface per capita grew between 1990 and 2000, which is an indication of sprawl-type growth.

Session B: 11:00 am, Carl Bolster, Ph. D., University of New Hampshire

Impacts of Wastewater Treatment Plants on New Hampshire's Estuaries

In response to the growing recognition of the potential significance of WWTF overflows and discharges on microbial contamination of shellfish-growing and recreational surface waters in the NH Seacoast, an effort was made to assess and characterize bacterial and nitrogen loading from WWTF effluent to estuarine ecosystems within the NH Seacoast. In this study we focused our attention on the 11 WWTFs with discharges that are located downstream of tidal dams (9 in New Hampshire and 2 in Maine). The specific objectives of the project included: 1) assess the importance of chronic bacterial loading from WWTFs on estuarine water quality, 2) determine ratios of TC:FC:E. coli for each WWTF, 3) characterize nitrogen (N) loading in the surface water from effluent discharge by determining the major N species [i.e., NH₄⁺, NO₃⁻, dissolved organic nitrogen (DON)] associated with each WWTF, 4) determine the monthly and daily variability in bacterial and nitrogen concentrations in WWTF effluent, and 5) determine the effect of elevated nutrient concentrations on the potential regrowth of indicator species in estuarine environments. It is intended that the data and information collected for this project will serve as the next necessary step for DES/NHEP to address WWTF problems in the Seacoast of New Hampshire.

Session A: 11:30 am, Jeff Deacon, US Geological Service & Sally Soule, NH Coastal Program

Water Quality of Small Streams in the Coastal Region of New Hampshire and the Influences of Urbanization

The USGS and NHCP collaboration began in 2000 with a jointly funded sampling program. Ten sampling sites were selected based on the amount of impervious surfaces within the watersheds. Water samples are being collected to assess levels of nitrogen, phosphorus, bacteria, pH, and dissolved oxygen. Aquatic insect samples are also being collected once during each summer. Preliminary results indicate that nitrogen, phosphorus, and bacteria levels generally increase, while aquatic insect populations generally decline, with higher amounts of impermeable surfaces in the watersheds.

Session A: 1:00 pm, Ray Grizzle, Ph.D., University of New Hampshire

Shellfish Restoration Projects in Coastal New Hampshire

This presentation will provide an overview of several ongoing, experimental scale bivalve shellfish restoration projects involving mussels and oysters aimed at determining the most effective approaches for larger scale efforts.

Session B: 1:00 pm, Joseph Ayotte, U.S. Geological Survey

Citizen Awareness of Arsenic in Private Bedrock Wells in Southeastern New Hampshire

Arsenic, at concentrations above 10 micrograms per liter, occurs in 1 out of 3 wells in major parts of southeastern New Hampshire. The high occurrence rates appear related to bedrock geologic data for the area. An estimated 41,000 people may use wells with arsenic above 10 micrograms per liter.

Session A: 1:30 pm, Paul Geoghegan, Normandeau Associates Inc.

Soft Shell Clam Monitoring in Hampton Harbor

Monitoring of softshell clam resources has taken place in Hampton Harbor since 1974. Annual density of young-of-the-year (YOY) clams (1-25 mm) has been relatively consistent, but there has been a decreasing trend since 1996 in the density of yearling clams (26-50 mm). Density of adult clams (>50 mm) reached historic highs in the 1990s but has since decreased, possibly a result of lower recruitment from the yearling stage, predation by green crabs, and increased digging pressure. Post-settlement processes may account for the observed decrease in density between the YOY and yearling stages. Density of YOY clams did not appear to be strongly related to larval supply.

Session B: 1:30 pm, Robert Roseen, Ph.D., Environmental Research Group, Department of Civil Engineering, University of New Hampshire

Examination of Inter-Tidal Groundwater Discharge in a Salt Marsh Ecosystem, Hampton Harbor, NH

Recent studies of inter-tidal groundwater discharge using thermal imagery have illustrated a strong correlation with hydrogeology and landcover. In the case of a large low-permeability salt marsh as in Hampton Harbor, effectively no inter-tidal groundwater discharge was detected.

Session A: 2:00 pm, Brian Smith, NH Fish & Game/ Great Bay National Estuarine Research Reserve

Anadromous Fish in Coastal New Hampshire: Habitat, History, and Population Trends

Roughly ten species of anadromous fish currently occur in NH waters. Estuaries and the specific habitats they contain, are an essential component in their life history. Currently, NH F&G is actively engaged in restoration and monitoring projects involving many of these anadromous species. The varied approaches to restoration and monitoring, as well as the condition of these fish stocks, will be discussed along with research focused on the future of our anadromous fish restoration efforts.

Session B: 2:00 pm, David R. Wunsch, Ph. D., New Hampshire Geological Survey

Ground Water Sustainability

Groundwater sustainability is a hot topic among water system managers, planners, hydrologists, and the general public. Areas experiencing growth, such as the Seacoast region of New Hampshire, have special challenges in order to institute a sustainable ground-water use strategy. This presentation will cover the definitions of the term sustainability, and highlight some hurdles that need to be overcome to implement a groundwater management strategy that is both sustainable, and provides for ground water protection.

Session A: 2:30 pm, Frederick T. Short, Ph.D., University of New Hampshire

Eelgrass Trends

Eelgrass in Great Bay Estuary is holding its own -- barely -- despite increases in nutrient loading to the estuary. Eelgrass persists and has expanded in some areas where upgraded sewage treatment has improved water clarity at the mouth of some rivers. Sporadic outbreaks of wasting disease, impacts from oils spills, and increased sediment run-off are additional threats to eelgrass abundance and health.

Session A: 3:00 pm, Ted Diers, NH Coastal Program

Coastal Wetland Restoration

New Hampshire seacoast communities in partnership with state and federal agencies have been restoring salt marshes for over a decade. The primary thrust of this work has been on eliminating tidal restrictions. Now, as most of the tidal restrictions have been fixed, the NH Coastal Program and its partners are turning their attention to other types of restoration both in salt marshes and other important coastal resources.

Session B: 3:00 pm, Dr. Steve Jones, UNH-Jackson Estuarine Laboratory, Scott Nolan, UNH-Jackson Estuarine Laboratory and Natalie Landry, NH Department of Environmental Services

Stormwater Treatment Evaluation Project in Seabrook

The University of New Hampshire is researching the pollutant removal effectiveness of a new stormwater treatment device called the SmartSponge Plus. This device was recently installed in a storm drainage system in Seabrook, NH. The performance evaluation of this technology is being funded through the NH Department of Environmental Services and the NHEP.

Session A: 3:30 pm, Grace Bottitta, Ducks Unlimited

Monitoring and Restoring New Hampshire Salt Marshes: The New Hampshire Marsh Monitors and Pickering Brook Salt Marsh Restoration, Greenland, NH

The 40 acre Pickering Brook salt marsh is one many marshes on the Atlantic Coast that was ditched and drained in the 1930s in an attempt to control mosquitoes. The result was the loss of semi-permanent open water on the marsh surface, critical for black ducks, wading birds, shorebirds, and fish. Ducks Unlimited, the University of New Hampshire, NH Coastal Program and the NH Marsh Monitor volunteer program documented the degraded "health" of Pickering Brook salt marsh by examining fish and bird use, mosquito larvae abundance, and groundwater and salinity levels. Data collected will assist in the design of restoration activities.

Session B: 3:30 pm, Andrea Donlon, NH Department of Environmental Services

Storm System Sleuthing – Hunting Down Illicit Discharges in the Coastal Watershed

DES has been working with coastal municipalities since 1996 to find and eliminate "illicit" discharges (mainly sewage) in coastal streams and storm drainage systems. This presentation will give a summary of the accomplishments to date, including a description of a NHEP-funded grant program and a brief overview of how these efforts fit into the new federal stormwater requirements called NPDES Phase II.

Land Planning for a Healthy Estuary: 10:00 am, Bob Miller, The Nature Conservancy

Great Bay Resource Protection Partnership: Science-Based Planning, Partnership-Driven Conservation Success

After the North American Waterfowl Management Plan Identified the Great Bay Focus Area (New Hampshire) in 1994, science-based planning and development of a broad based partnership with multiple missions have guided the protection of multiple habitats that extend beyond the original Focus Area. The Great Bay Resource Protection Partnership was organized to support the North American Waterfowl Management Plan's Atlantic Coast Joint Venture by developing and implementing protection strategies. Nine principle partners (non-profit organizations, state and federal agencies) and multiple local and community partners have secured private and public funding to protect critical lands and waters for the goal of waterfowl habitat, exemplary natural communities, and rare species conservation at Great Bay Estuary. Taking advantage of expertise offered by a broad-based partnership and a combination of tools, including field inventories, science-based natural resource planning, and GIS- based land prioritization, the partnership has demonstrated collaborative, efficient, and long-term protection of Great Bay's most critical natural resources.

Land Planning for a Healthy Estuary: 10:25 am, Dijit Taylor, Center for Land Conservation Assistance

Municipal Funding for Land Conservation

New Hampshire towns appropriated over 72 million dollars of local tax money for open space conservation between 2001 to 2003! Learn the who, what, when, where, why and how of this exciting trend. You will hear stories of how different towns have passed bonds and other funding measures, what to watch out for if you are trying to do this in your town, and what conservation projects the towns are accomplishing with these new funds.

Land Planning for a Healthy Estuary: 10:50 am, Fay Rubin, Ph. D., University of New Hampshire

GRANIT Tools and Resources for Land Protection Planning

The GRANIT System, New Hampshire's statewide GIS clearinghouse, offers a suite of resources to those involved in land protection planning at the local, regional, and/or statewide level. This presentation will focus on two of those resources: the spatial database housed at Complex Systems Research Center, UNH, and the Conservation Lands Viewer - a web-based mapping application that utilizes the database.

Land Planning for a Healthy Estuary: 11:15 am, Danna B. Truslow, Seacoast Land Trust

Seacoast Natural Resource and Land Protection Prioritization Mapping

Prioritizing land protection parcels through Geographic Information System mapping has been a valuable land protection tool for the Seacoast Land Trust. The Seacoast Land Trust works cooperatively with seacoast communities and the Society for the Protection of New Hampshire and will be completing GIS mapping of their service area early in 2004. Our successful projects have generated interest in and funding for land protection. It has also brought the abstract idea of land protection down to a tangible, very powerful illustration of our existing and threatened natural resources. Combined with ambitious outreach programs, these maps have been a great learning tool for this young land trust as well as landowners and concerned citizens that have put them to use.

Land Planning for a Healthy Estuary: 11:40 am, Jim Oehler, New Hampshire Fish & Game Department

New Hampshire's Comprehensive Wildlife Conservation Plan - a Blueprint for Conserving the State's At-risk Species

Since the early 1990s the Teaming with Wildlife coalition has worked to secure funding for state fish and wildlife agencies to take preventative actions that help keep rare species from becoming endangered and keep common species common. In response to these, and many other efforts, in fiscal year 2002 President Bush signed the State Wildlife Grant program into law. This program distributed \$85 million among the states to address the "species in greatest need of conservation" including those species not hunted or fished. To be eligible for these funds, a state must submit or commit to develop a comprehensive wildlife conservation plan by October 1, 2005. This presentation will outline the elements of New Hampshire's Comprehensive Conservation Plan, and explain how other agencies, conservation organizations, and municipalities can use the products of the plan to help guide land protection efforts.

Land Planning for a Healthy Estuary: 1:00 pm, Steve Whitman, NH Office of State Planning & Energy

Achieving Smart Growth in New Hampshire

New Hampshire is growing. This brings vitality to our state - new people, new ideas, new energy. But changes are also happening to our traditional landscape of fields, forests, and open spaces, while we see businesses and other activities leaving downtown areas. Encouraging growth and development, while preserving the character and resources of our communities and State are key issues for our future. Join us to learn more about how the smart growth efforts in New Hampshire are trying to focus attention on these key issues.

Land Planning for a Healthy Estuary: 1:30 pm, Amanda J. Lindley Stone, UNH Cooperative Extension

Natural Resources Outreach Coalition (NROC) Community Assistance Program

The Natural Resources Outreach Coalition (NROC) helps communities in the Coastal Watershed deal with the effects of growth through natural resource-based planning. This approach addresses the need to protect natural resources, and minimize the impacts of development. NROC educates communities about their natural resources and tools for protecting them, facilitates bringing boards and committees together, and helps communities to focus their goals, create a workplan to move planning into action, and build community support. Accomplishments in recent NROC communities will be highlighted.

Land Planning for a Healthy Estuary: 2:00 pm, Carolyn Russell, NH Department of Environmental Services

Site Planning and Conservation Subdivisions

Changes in land cover with development can negatively impact water resources. But there are changes that can be made in site planning, subdivision design, and zoning to lessen these potential impacts. This presentation will briefly review ideas for guiding and designing new development to better protect water resources.

Land Planning for a Healthy Estuary: 3:00 pm, Mark West, West Environmental, Inc.

Freshwater Wetland Mitigation Inventory for New Hampshire's Nineteen Coastal Communities

West Environmental, Inc. together with Carex Ecosystem Sciences and Doucet Survey, under contract with the NH Office of State Planning, have identified and mapped potential freshwater mitigation opportunities in nineteen (19) communities that border coastal or estuarine habitats. The overall goal of this inventory project is to empower local communities to protect and restore freshwater resources by providing them with data on potential mitigation sites.

Land Planning for a Healthy Estuary: 3:30 pm, Brad Anderson, Moose Mountain Regional Greenways & Nancy B. Rendall, Blue Moon Environmental, Inc.

Prime Wetlands Designation

This session will include an overview of work conducted by Blue Moon Environmental, Inc. as part of Moose Mountain Regional Greenways' wetland study including use of GRANIT/GIS data to identify significant wetlands for protection options.